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HMC182S14

GaAs MMIC SP4T NON-REFLECTIVE SWITCH, DC - 2.0 GHz

Typical Applications

The HMC182S14 is ideal for:

• 800 - 1000 MHz Basestation

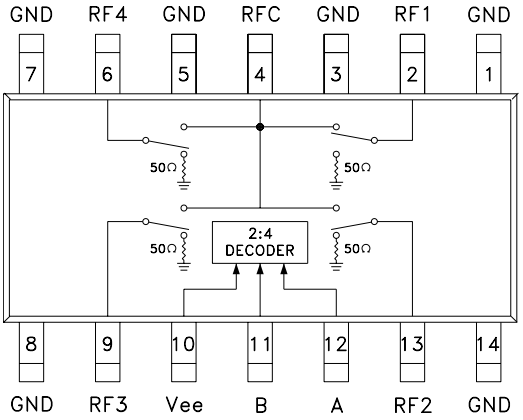
Features

Low Insertion Loss: 0.8dB

Integrated 2:4 Decoder

14 Lead SOIC Package

Functional Diagram



General Description

The HMC182S14 is a low-cost terminated SP4T switch in a 14-lead SOIC package for use in antenna diversity, switched filter banks, gain/attenuation selection, and general channel multiplexing applications. The switch can control signals up to 2 GHz. A 2:4 decoder is integrated on the switch, requiring only 2 control lines and a negative bias to select each RF path. The 2:4 decoder replaces 4 to 8 control lines normally required by GaAs SP4T switches. The HMC182S14 is a drop-in replacement for the HMC165S14 in applications requiring low "off state" VSWR. See positive bias/TTL SP4T HMC241QS16.

Electrical Specifications, T_A = +25° C, For 0/-5V Control and Vee = -5V in a 50 Ohm System

Parameter		Frequency	Min.	Typ.	Max.	Units
Insertion Loss		DC - 1.0 GHz DC - 2.0 GHz		0.7 0.8	1.1 1.2	dB dB
Isolation		DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz	41 36 28	45 40 32		dB dB dB
Return Loss	"On State" "On State" "Off State" "Off State"	DC - 1.0 GHz DC - 2.0 GHz DC - 1.0 GHz DC - 2.0 GHz	21 16 17 13	25 20 21 17		dB dB dB dB
Input Power for 1 dB Compression		50 MHz 0.5 - 2.0 GHz		22 24		dBm dBm
Input Third Order Intercept (Two-Tone Input Power = 7 dBm Each Tone).		50 MHz 0.5 - 1.0 GHz 0.5 - 2.0 GHz	25 41 37	30 45 41		dBm dBm dBm
Switching Characteristics		DC - 2.0 GHz				
	tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)			25 50		ns ns

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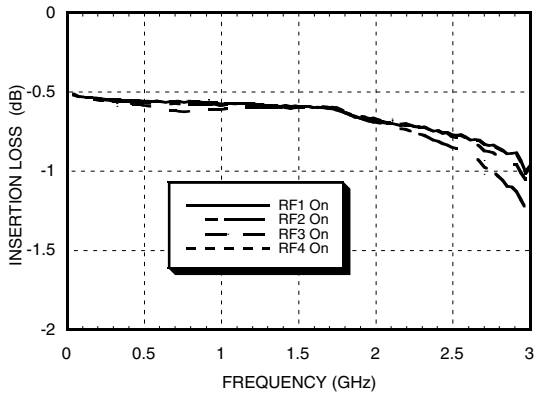
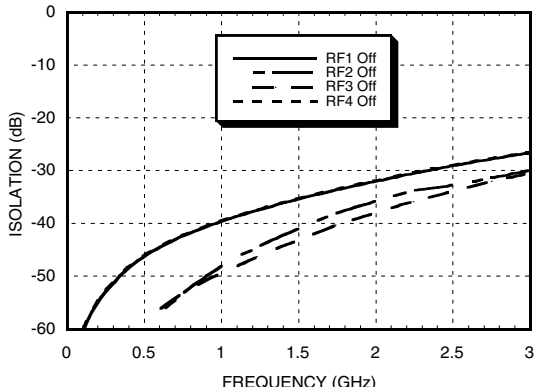
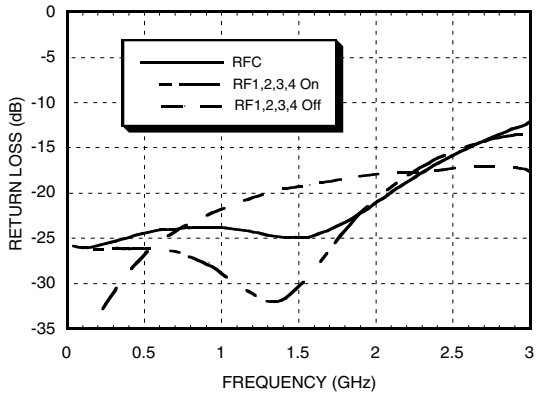
Insertion Loss



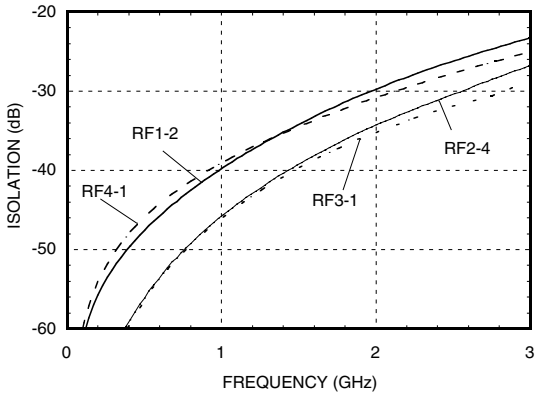
Isolation



Return Loss



Isolation Between Several RF I/Os



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GaAs MMIC SP4T NON-REFLECTIVE SWITCH, DC - 2.0 GHz

Absolute Maximum Ratings

Bias Voltage Range (Port Vee)	-7.0 Vdc
Control Voltage Range (A & B)	Vee -0.5V to +1.0 Vdc
Channel Temperature	150 °C
Thermal Resistance (Insertion Loss Path)	123 °C/W
Thermal Resistance (Terminated Path)	260 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
Maximum Input Power	+27 dBm (<500 MHz) +30 dBm (>500 MHz)

Truth Table

Control Input		Signal Path State
A	B	RFCOM to:
High	High	RF1
Low	High	RF2
High	Low	RF3
Low	Low	RF4

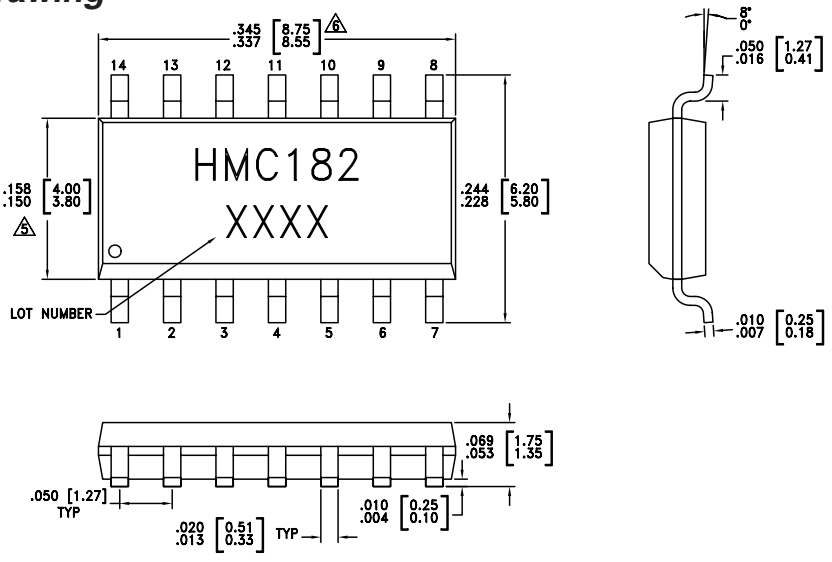
Control Voltages

State	Bias Condition
Low	0 to -3 VDC @ 70 uA Typ.
High	-5 to -4.2 VDC @ 5 uA Typ.

Bias Voltage & Current

Vee Range = -5.0 Vdc ± 10%		
Vee (Vdc)	Iee (Typ.) (mA)	Iee (Max.) (mA)
-5.0	4.0	7.0

Outline Drawing



NOTES:

1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEADFRAME MATERIAL: COPPER ALLOY
3. LEADFRAME PLATING: Sn/Pb SOLDER
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
6. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
7. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

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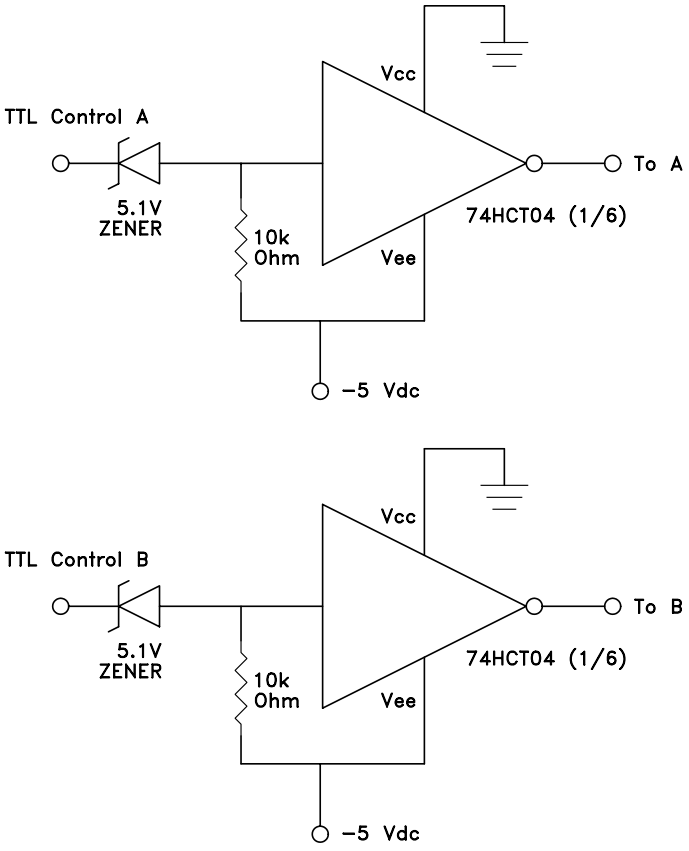
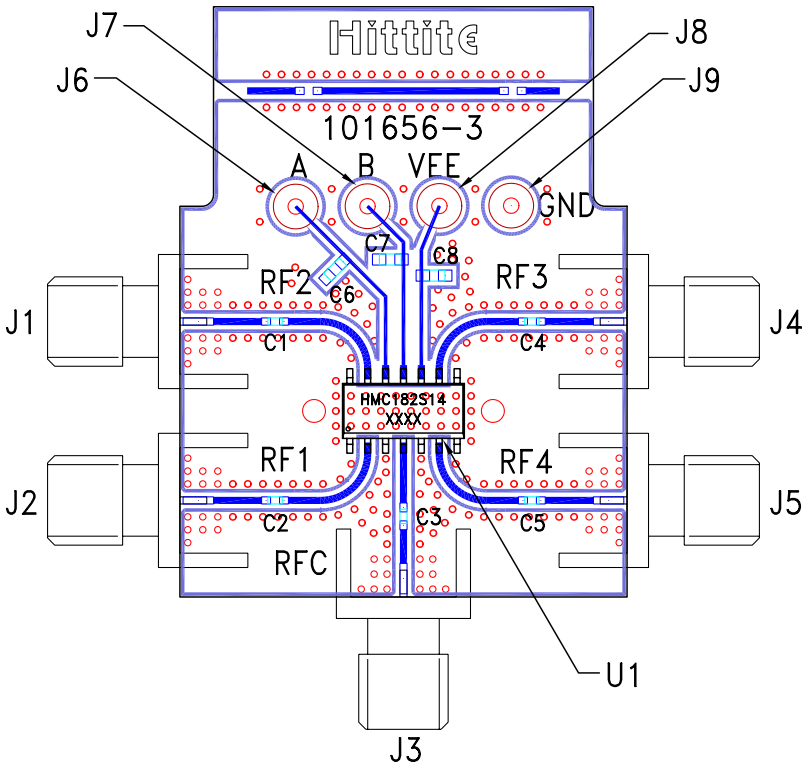
TTL Interface Circuit



Note:
Control inputs A and B can be driven directly with TTL logic with -5 Volts applied to the HCT logic gate Vee pin and to Vee (pin 10) of the RF switch.

Evaluation PCB



List of Material

Item	Description
J1 - J5	PC Mount SMA RF Connector
J6 - J9	DC Pin
C1 - C5	330 pF capacitor, 0402 Pkg.
C6 - C8	10,000 pF capacitor, 0603 Pkg.
U1	HMC182S14 SP4T Switch
PCB*	101656 Evaluation PCB
* Circuit Board Material: Rogers 4350	

The circuit board used in the final application should be generated with proper RF circuit design techniques. Signal lines at the RF port should have 50 ohm impedance and the package ground leads should be connected directly to the ground plane similar to that shown above. The evaluation circuit board shown above is available from Hittite Microwave Corporation upon request.

Notes: